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The scientistic stance: the empirical and materialist stances reconciled

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Abstract van Fraassen (The empirical stance, 2002) contrasts the empirical stance with the materialist stance. The way he describes them makes both of them attractive, and while opposed they have something in common for both stances are scientific approaches to philosophy. The difference between them reflects their differing conceptions of science itself. Empiricists emphasise fallibilism, verifiability and falsifiability, and also to some extent scepticism and tolerance of novel hypotheses. Materialists regard the theoretical picture of the world as matter in motion as a true and explanatory account and insist on not taking 'spooky' entities or processes seriously as potential explanations of phenomena that so far lie outside the scope of successful science. The history of science shows us that both stances have been instrumental in the achievement of progress at various times. It is therefore plausible for a naturalist to suggest that science depends for its success on the dialectic between empiricism and materialism. A truly naturalist approach to philosophy ought then to synthesise them. Call the synthesized empiricist and materialist stances 'the scientistic stance'. This paper elaborates and defends it.

Keywords Stance · Empirical stance · Materialist stance · Scientistic stance · Empiricism · Materialism · Scientism · van Fraassen

1 Introduction

van Fraassen (2002) contrasts the empirical stance with the materialist stance. The way he describes them makes both of them attractive, and while opposed they have something in common for both stances are scientific approaches to philosophy. The

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difference between them reflects their differing conceptions of science itself. Empiricists emphasise fallibilism, verifiability and falsifiability, and also to some extent scepticism and tolerance of novel hypotheses. Materialists regard the theoretical picture of the world as matter in motion as a true and explanatory account and insist on not taking 'spooky' entities or processes seriously as potential explanations of phenomena that so far lie outside the scope of successful science. The history of science shows us that both stances have been instrumental in the achievement of progress at various times. It is therefore plausible for a naturalist to suggest that science depends for its success on the dialectic between empiricism and materialism. A truly naturalist approach to philosophy ought then to synthesise them. Call the synthesized empiricist and materialist stances 'the scientistic stance'. This paper elaborates and defends it.[1]

In the next section van Fraassen's account of why empiricism must be a stance and his account of the empirical stance are reviewed without dissent. It is noted that key to the empirical stance is the rejection of the activity called 'a priori metaphysics'. In Sect. 3 the materialist stance as van Fraassen sees it is outlined. It is argued that his critique of the positive metaphysical content of the materialist stance is not conclusive, and that he fails to do justice to its negative methodological content and its importance in the history of science. For van Fraassen, both stances go awry when they succumb to the temptation to metaphysics. By contrast, in Sect. 4, the scientistic stance is developed by reflection on how metaphysics can be conducted naturalistically. It is shown how van Fraassen's constructive empiricism already provides an account of science that may be modified to incorporate naturalised metaphysics within an empiricist approach to science. Finally, Sect. 5 offers some brief reflections on the secular stance and its relationship to the other stances already discussed.

2 The empirical stance

Empiricism is often characterised negatively as the view that there is no substantive a priori knowledge, or positively that all knowledge comes from experience. Empiricism is often treated by naturalists as a high-level empirical hypothesis. Not believing that one can pull oneself up by one's bootstraps, van Fraassen denies that empiricism is empirically confirmed. If naturalised empiricism is the Scylla, the Charybdis is transcendental empiricism which is metaphysical since it consists in the acceptance of a substantial a priori claim about the means by which knowledge can be obtained.[2] According to van Fraassen empiricism is not best thought of as an epistemological theory, but as a stance or cluster of attitudes.

The positive part of the empirical stance includes a generic admiration for empirical science, and a specific norm of anti-dogmatism, that Popper of course regarded as the key component of scientific rationality, according to which no hypotheses should be ruled out of consideration in principle. If nothing is ruled out in principle then of

[1] This paper is an attempt to further articulate the resolution of the empirical and materialist stances proposed in Ladyman and Ross (2007), Sect. 7.1; in so far as this project succeeds, Don Ross is entitled to at least half the credit for it. This paper also builds on some points made in Ladyman (2004a) and Brown and Ladyman (2009). I am also deeply indebted to Bas van Fraassen.

[2] See van Fraassen (1994, 1995).

course nothing is in principle ruled in either. As van Fraassen (2002, p. 45) puts it: "Any factual hypothesis must in principle be given over for empirical investigation."[3]

Now consider his 'principle zero' namely the claim that for any philosophical position X, there is a statement X+, such that to adopt X is to believe X+ (2002, p. 41). If X = empiricism, and X+ = 'experience is the one and only source of information about the world', then, since disagreement with any admissible factual hypothesis, such as X+, is admissible, X+ cannot be constitutive of empiricism after all. In general, empiricism cannot consist of a doctrine such as that rational intuition cannot deliver substantive knowledge, or that all knowledge comes from experience, because these doctrines amount precisely to attempts to rule certain hypotheses in and out in principle.[4] Empiricists believe that "as in science, so in philosophy" (2002, p. 44) and so every philosophical hypothesis must be accepted or rejected on a provisional basis, and on the basis of the evidence and arguments for and against it alone.

If empiricism were exhausted by open-mindedness and falliblism it would have a toothless bite. The reason it is not is that these positive components to the empirical stance are accompanied by a negative one that is no less important to its identity. The story of empiricism is, according to van Fraassen, "a recurrent rebellion against the metaphysicians" (2002, p. 36): Aristotle versus Plato, nominalism versus Aristotelian scholasticism, British empiricism versus Continental rationalism, and logical positivism versus idealism and romanticism. In contemporary philosophy we find van Fraassen himself leading the charge against analytic metaphysics.[5] While the philosophers referred to here share no set of doctrines, all of them criticised what they saw as extravagant metaphysical systems that were insufficiently in touch with science. More specifically, empiricism is characterised by:

(a) … rejection … of demands for explanation at certain crucial points

and

(b) … strong dissatisfaction with explanations (even if called for) that proceed by postulation (ibid, 37).

Of course, in its current incarnation in the form of constructive empiricism, this disdain for explanation is expressed by scepticism about the modal content of scientific theories, as well as agnosticism about the existence of theoretical entities. Empiricism in the hands of van Fraassen is therefore both deflationary about the scientific worldview, and yet humble in the face of empirical science.

Naturalists share van Fraassen's rejection of analytic metaphysics. In so far as empiricism defers to science then naturalists are empiricists. Yet van Fraassen equates naturalism with materialism and sets up the latter as foil to empiricism. In the next

[3] However, it is dogmatic in so far as only empirical investigation is considered relevant; see Rowbottom (2005).

[4] See also Jennifer Nagel's argument that the empiricist needs to have a priori knowledge of what counts as part of the content of experience discussed in her (2000) and Ladyman (2007).

[5] Ladyman and Ross (2007) Chap. 1 enthusiastically joins the attack.

section van Fraassen's account of materialism is presented and criticised in order that lessons might be learned for the naturalistic synthesis of empiricism and materialism.[6]

3 The materialist stance

The materialist stance is discussed alongside empiricism in the second lecture in *The Empirical Stance*. By arguing that materialism must be thought of a stance, because it is not captured by any plausible factual hypothesis, van Fraassen gives support to his claim that his principle zero is false and thus also his proposal that we think of empiricism as a stance. As was noted in the Introduction, empiricism and materialism both involve a certain deference to science in philosophy, nonetheless there are important differences between them. As van Fraassen sees empiricism the critique of metaphysics is central to it. On the other hand, materialism is one of the 'putative exemplars of metaphysical theories about what the world is like' (p. 49). Empiricism is mostly about epistemology and methodology and so to think of it as a stance follows quite naturally. In contrast, materialism is centrally concerned with metaphysics, and so to think of it as a stance is less natural. Indeed, van Fraassen argues that it is a stance that has been misunderstood by its own adherents much more than empiricism ever was. Materialism may be a stance, or cluster of attitudes, rather than a particular ontological theory, but it is a stance or cluster of attitudes towards what there is rather than towards knowledge. That said, materialism has a methodological component too and it is argued below that van Fraassen neglects the importance of it as the negative component to materialism, and also that he is overly dismissive of the positive ontological component of materialism.

If X is materialism, then X+ is the claim that 'matter is all there is'. The problem with this is not that it is self-defeating, but that, as it was understood by the founders of materialism, it has been falsified by physics. The philosophers that exemplify the materialist tradition, such as d'Holbach, Laplace, Quine, Lewis, Smart, all maintained that everything is physical in the sense that they admit into their ontologies only entities that physicists endorse. The problem with the doctrinal instantiation of the materialist tradition at any point in the development of science is that the account of what matter is will be incomplete and in need of revision. The physical once meant 'composed out of matter', where matter was understood as Descartes' extended substance, but physics soon came to supplement matter in this sense with ethers, fields, spacetime, and so on. So it seems that across the tradition of materialism, 'material' means nothing more than 'whatever physicists endorse', where this has changed considerably over time. However, if the definition of 'matter' is allowed to be reinterpreted in the light of scientific advances in this way then materialism seems to become empty (because anything in principle could fall under the term 'matter'). This dilemma is familiar from contemporary discussions of physicalism wherein it is known as Hempel's dilemma (1965).

[6] Naturalism in this context is roughly the idea that philosophy should ally itself with science. van Fraassen's identification of naturalism and materialism is not warranted in so far as naturalism is also identifiable with empiricism. For more on naturalism see Papineau (2007).

Much ink has been spilled by physicalists in the attempt to provide a non-empty but scientifically plausible definition of physicalism.[7]

Whether or not this project has failed as van Fraassen suggests, even if it had succeeded, it is not obvious that contemporary physicalists would agree that the physical is all there is. In contemporary debates, a commitment to supervenience as a way of expressing the asymmetric harnessing of the mental realm to the physical realm, is often taken to be sufficient for physicalism. Prima facie this leaves open the ontological status of mental phenomena, and while Kim (1998) famously argues for a reductive identity theory, using the causal exclusion argument plus a commitment to the reality and full-bloodness of mental causation, the issue is by no means settled. Physicalism is certainly the heir of the materialist tradition, even though many physicalists do not believe that matter is all there is, and many defend a non-reductive physicalism according to which there is an emergent realm of mental causation.

van Fraassen uses 'materialism' and 'physicalism' interchangeably and characterises the stance as follows:

> [M]aterialism … is not identifiable with a theory about what there is but only with an attitude or cluster of attitudes. These attitudes include strong deference to the current content of science in matters of opinion about what there is. They include also an inclination (and perhaps a commitment, at least an intention) to accept (approximative) completeness claims for science as actually constituted at any given time (ibid, 59).

These are positive components of the materialist stance but, just as the empirical stance has both positive and negative components, so too does the materialist stance. van Fraassen emphasises the negative component of empiricism namely the rejection of metaphysics, but says less of the negative component to materialism and its scientific significance.

The negative aspects of the materialist stance have been very important in the history of science notably in the debates over chemical forces and vital forces in the late nineteenth and early twentieth centuries. Materialism is often expressed by scepticism about putative theories about the world that appear to involve the supernatural. The term 'supernatural' is taken to rule out the positing of entities such as morphic fields, mental energy or mental substance. When we consider to the idea of forces of empathy and sympathy we return to the debate about the romantic idealist and magical theories of the late Renaissance. Hostility to them led Galileo to reject the idea that the Moon causes the tides on Earth so certainly physicalism need not always engender success, however, arguably the statistics are favourable. Of course, Newton's theory of gravity was acceptable despite its apparent invocation of action at a distance, but this was

[7] The recent history of the debate about physicalism is described in Ladyman and Ross (2007), Sect. 1.4, accompanied by an up-to-date list of references. Hempel's dilemma motivates Ney (forthcoming), in the spirit of van Fraassen's discussion of stances, to defend the idea that physicalism is best thought of as an attitude rather than a doctrine. However, she differs from van Fraassen by regarding it as an attitude towards the forming of ontological commitments rather than as an attitude towards scientific research. According to Ney, none of the standard definitions of physicalism simultaneously avoid Hempel's dilemma, keep a commitment to physics, and remain distinguished from dualism (p. 4). Brown and Ladyman (2009) propose a formulation of physicalism that they claim meets all these criteria.

because one could ignore that and calculate with it in order to predict new facts and fit old ones into a system of descriptions that is simple and unified, and because it was never essential to the theory that the force be understood as acting at a distance rather than as being mediated by something. The success of field theory, motivated by the drive for locality and mechanism, is further evidence of the fecundity of materialism.

Furthermore, it is not clear that physicalism cannot be formulated as an ontological position that is both non-trivial and plausibly true. One virtue that Brown and Ladyman (2009) claim for their proposed account of physicalism is that it allows that physicalism could be refuted by future scientific discoveries. Suppose that physicalism involves first of all a commitment to the idea that physics must encompass all phenomena by definition (and so if all phenomena cannot be encompassed by science then physics will never be complete), but conjoined with this is an empirical claim to the effect that as science progresses it will never be necessary to introduce new entities or processes into fundamental physics solely to account for living or mental phenomena,[8] and that fundamental physics will never directly refer to mental or intentional entities or processes. This view could be wrong—for example, if something like Chalmer's Type-D dualism was correct, then the entire tradition of materialism, physicalism and naturalism would be refuted (Chalmers 2002)—but the history of science give us good reason to think this will not happen.

van Fraassen says that "Materialism […] survives by changing so as to accommodate the new sciences" (2002, p. 60). However, this is true only up to a point and it is arguable that if no new discoveries in science could undermine the materialist tradition then it would not be of interest. He attacks the alleged rationale of materialism as the necessary foundational philosophy of empirical science:

> '…there can…be no question of regarding materialism as an assumption at the foundations of science. There is no "presumptive materialism" that constrains scientific theories to consistency with certain determinate factual theses' (p. 60).

This is correct, but materialism need make no such grandiose claim to a foundational role for science. Rather traditionally materialism has been associated with a secular, anti-conservative, anti-clerical, and anti-mystical stance, with the denial of mental or spiritual substance. The materialist stance involves more than van Fraassen allows.

4 The scientistic stance

Ladyman and Ross (2007) suggest that their project of naturalised metaphysics synthesises the empirical and materialist stances. It seems right to identify the latter as primarily metaphysical rather than epistemological, and yet for van Fraassen the empirical stance is essentially opposed to metaphysics. Prima facie the stances are

[8] The late nineteenth and early twentieth century controversy within science about whether physics could account for chemical phenomena ended when there turned out to be no need to introduce new physics solely to account for chemical bonds. This is one of the main reasons physicalism in general became popular. For an introduction to the history of physicalism see Papineau (2001).

indeed incompatible. However, attention to the characteristics of metaphysics that incur empiricist disdain, and to the role naturalised metaphysics can play in science, suggests that empiricists can and must tolerate metaphysics. Indeed, van Fraassen's constructive empiricism and work in the foundations of physics show us how metaphysics can be accommodated within science and scientistic empiricist philosophy.

According to van Fraassen, metaphysics has no goal except the truth about the unobservable deep structure of reality, unlike science which, whether or not it aims for the truth, which is of course a point of contention between scientific realists and constructive empiricists, certainly has other proximate goals such as empirical adequacy, and engineering, medical and technological applicability. Hence, if we discover that a scientific theory, such as Newtonian mechanics, is not true after all, this does not lead us to regard it as worthless. The difference between metaphysics and empirical science is that, in the case of the former unlike the latter, there is nothing at stake that could count as getting it right and wrong. Theories in metaphysics are derided by van Fraassen as nothing more than 'logical exercises pursuing the illusions of reason' (p. 30). Although it is easy to construct logically consistent additions to empirical science, we can have no reason to believe them because they are not empirically testable.

Of course, it is often argued that much of science is unverifiable or falsifiable, but van Fraassen argues that there is an important difference in how the disciplines of science and metaphysics proceed when presented with the choice between rival theories. In science, while coherence (both internal and with respect to other theories) and other super-empirical virtues may play a role in theory choice, there is a constant drive to empirically test the rivals, and as soon as empirical testing delivers a verdict it trumps all other considerations (p. 12). A striking example is Bohr's early theory of the atom that was accepted despite seemingly being incoherent just because it could account for the empirical evidence where no other theory could. This does not happen with metaphysical theories. For example, in the recent prominent debate about the unrestricted composition principle that concerns whether or not arbitrary mereological sums of simples are themselves objects, nobody is searching for differing implications of the two views for some experiment or observable phenomena.[9]

van Fraassen may be right that metaphysicians characteristically pay no heed to empirical evidence but this does not entail that there is nothing that could count as empirical testing in metaphysics. He neglects to consider the possibility that what counts as empirical testing for metaphysical theories is their success in inspiring empirically successful science. For example, one could argue that the metaphysical theory of atoms in the void was successful in so far as it inspired Newton's physics, whereas the Cartesian theory of a material plenum was unsuccessful insofar as it failed to inspire equally successful physics and was incompatible with Newton's physics. The elimination of action at a distance, materialism and other metaphysical projects have all been intimately connected with the development of various parts of science at various times, and have thereby met with varying degrees of success and failure. Surely, the progress of physics suggests that there is something right about seventeenth century atomism.

[9] See, for example, Sider (2007).

There are many phenomena that can be systematised, predicted and controlled using the theoretical models of atomistic science such as the kinetic theory of gases, the periodic table and so on. Indeed, there are many explanations in terms of atoms too but we need not care about that. We need only note that in many circumstances we are able to best interact with the environment by representing it to ourselves as composed of atoms. This includes forming counterfactual judgments and other kinds of modal thought. Certainly nothing comparable has been achieved by the metaphysics of dualism or idealism or panpsychism.[10]

So it seems that metaphysical theories are connected with the empirical world studied by science after all, although arguably more indirectly than even the most theoretical parts of scientific theories. Indeed, the Duhem problem suggests that there can only ever be a difference of degree here, especially when we bear in mind the borderline cases between high level theory and metaphysics such as global conservation principles. On the other hand, even if it is conceded that there is a difference of kind between metaphysical and scientific theories such that no kind of empirical confirmation or falsification of the former is possible, it remains true that metaphysical speculation has been useful in the achievement of empiricist goals, and so ought to be just as acceptable to an empiricist as high level theory. Perhaps then while all the metaphysical theories we know of are false, there is nonetheless something that could count as getting it right in metaphysics. It is not to give explanations but rather to contribute to the progress of science.

According to van Fraassen, metaphysicians have in common with scientific realists their desire to interpret and explain what is already understood in so far as it can be. Yet van Fraassen has indeed engaged in a kind of metaphysical project himself. In his book on quantum mechanics (1991), he is throughout addressing the question of 'what the world could be like according to the theory' (see especially p. 4). This means interpreting the theory and assessing its implications for matters such as the status of causation, whether there are possessed values for experiments that might have been performed, and so on. He argues that the search for interpretations of quantum theory is valuable because, although we are not in a position to say how the world is, we at least have the prospect of knowing something about ways the world might be. This may stimulate future scientific research, and it may offer resources to scientists who are attempting to construct new theories that go beyond the empirical adequacy of existing ones. He is of course well aware that scientists themselves have engaged in this activity and that doing so is integral to the development of science. In this sense, we may say that this activity is really part of science rather than metaphysics, and certainly it is not one to which analytic metaphysics as currently practiced seems relevant so the critique of metaphysics stands. Nonetheless it seems that there is something that counts as getting it right and getting it wrong in this quasi-metaphysical project, and even an empiricist has a pragmatic reason for pursuing the interpretation of science, just as there is a pragmatic motivation for empiricists to construct theories that describe unobservable structures beyond the phenomena, given that this methodology has realised empirically adequate theories in the past.

[10] This is of course a very Lakatosian way of looking at the relationship between science and metaphysics. See his (1978).

According to constructive empiricism, acceptance of scientific theories involves over and above belief in empirical adequacy, a pragmatic component. It is important that constructive empiricism be able to accommodate what van Fraassen calls the 'phenomenology of scientific activity'. According to van Fraassen, scientists will see the world in terms of the theory, and pragmatics explains how it is that constructive empiricists can accept scientific theories that putatively refer to unobservable entities. We come to believe in the predictive power of science, and become familiar with making predictions about what is and is not possible to observe on the basis of theories and models. Then we guide our decision making on the basis of the scientific account of what is and is not possible. Often such decisions matter a great deal and it would be morally irresponsible for the agents involved to ignore the modal structure of theories. Of course, the scientific realist may believe that this modal structure does indeed represent the modal structure of the world, whereas the constructive empiricist will believe that it reflects only the structure of theories, but nonetheless the constructive empiricist will proceed pragmatically as if the realist were right.[11] Indeed, van Fraassen believes that if you hold that certain observed regularities have the status of lawlike generalisations then it follows that the counterfactuals that will be true in your representation of the world are those that do not violate the laws. One may only accept this modal structure for pragmatic purposes but the scope of the latter extends far into our lives including for example into debates about creation science, intelligent design and what children should be taught in school.

In sum, it seems an empiricist could have a pragmatic commitment to a metaphysical theory, and could entertain it as a way the world might be, just as the constructive empiricist has a pragmatic commitment to theoretical superstructures and is interested in realistic interpretations of science as accounts of ways the world might be. Furthermore, since van Fraassen maintains that there is no epistemic connection between the evidence for a scientific theory and belief in its truth (beyond its truth concerning the observable, in other words, its empirical adequacy), he ought to think that metaphysical theories are in same position. In sum, it seems that consistency requires the empiricist to adopt an attitude to metaphysics analogous to that which she adopts towards the extra-empirical content of scientific theories.

van Fraassen argues that questions in metaphysics are "don't care" issues (pp. 231–232). The question about unrestricted composition is a good example that is related to van Fraassen's discussion of whether the world exists qua object. However, it is not obvious that all metaphysical questions are quite so empty. Consider the questions as to whether time has a privileged direction, whether causation is a fundamental feature of reality, whether the world has a fundamental level, whether reductionism of various kinds is true, whether space and time are infinite, or whether there is absolute time. These questions are importantly different to the question about unrestricted composition. The most salient difference is that no scientist is professionally interested in

[11] van Fraassen thinks that the defence of scientific realism must involve modal metaphysics, in other words a theory of laws of nature, singular causation, essences or similar. For van Fraassen, this means it ultimately rests on explanation by posit. The nominalist stance is central to van Fraassen's empirical stance it seems. However, I have argued that even the constructive empiricist must incur some metaphysical commitments (see my (2000), the reply by Bradley Monton and van Fraassen (2003) and my reply to them (2004b)).

the latter question, whereas many scientists are professionally interested in the former list of questions. Yet those questions are undeniably metaphysical. Ladyman and Ross (2007) argue that we ought to distinguish between good and bad metaphysics and that the difference is captured by what they call the 'Principle of Naturalistic Closure'. The latter is an attempt to make precise the intuitive difference between questions that contemporary scientists might care about and questions that are completely irrelevant to contemporary science. Perhaps then van Fraassen is too hasty is his dismissal of metaphysics, and that no demand for explanation need drive an interest in certain metaphysical questions. If that is right then perhaps there is a kind of metaphysics that even empiricists can and should embrace.[12]

Ladyman and Ross argue that there is indeed a kind of metaphysical theorising that is distinct from the metaphysics that is continuous with the development of particular scientific theories. Jonathan Lowe puts the idea very well:

> …[R]eality is one and truth indivisible. Each special science aims at truth, seeking to portray accurately some part of reality. But the various portrayals of different parts of reality must, if they are all to be true, fit together to make a portrait which can be true of reality as a whole. No special science can arrogate to itself the task of rendering mutually consistent the various partial portraits: that task can alone belong to an overarching science of being, that is to ontology (2006, p. 4).

While Lowe believes that this project should be carried out by philosophers establishing a priori what metaphysical packages are possible, even if science may be needed to say which of these is then true of the actual world, Ladyman and Ross advocate "radically naturalistic metaphysics" where this is "metaphysics that is motivated exclusively by attempts to unify hypotheses and theories that are taken seriously by contemporary science". Furthermore, once developed naturalistic metaphysics is only to be valued in so far as it potentially and actually feeds back into one or more of the special sciences.[13] Ultimately the fertiliser of naturalised metaphysics has no value if it does not help the tree of science bear empirical fruit. This means that the naturalistic metaphysician both takes risks, where van Fraassen rightly criticises the contemporary analytic metaphysician for not doing so (2002, p. 15), and also offers the prospect of gains other than a comforting pillow stuffed with explanations. Since this defence of metaphysics does not depend on appealing to the explanatory power of metaphysical theories, it is not so obviously incompatible with the empirical stance as characterised by van Fraassen.

5 The secular stance

It is worth considering briefly the relationship between scientism and secularism. For van Fraassen (2002) science is objective in three ways:

[12] Rowbottom (2005) argues that van Fraassen must agree quoting a passage from page 9 of his (1991).

[13] A particular bit of metaphysics may be valued just for its potential at first but if after a while it is of no actual use it should no longer be valued.

(1) It takes us out of the picture ('objective distancing').
(2) It adopts value-neutrality ('objective neutralisation').
(3) It approaches the study of its phenomena as if the existence and concerns of human beings were irrelevant ('the Copernican spirit' or 'objectifying inquiry').

According to him, the secularist is someone who thinks that only the results of objectifying inquiry should be taken as cognitively significant. He associates scientific realism with secularism and implies that the secularist is someone who thinks that science gives us a complete worldview. Hence, the materialist stance as he characterises it is closely related to the secular stance.

Furthermore, van Fraassen's empiricist stance seems compatible with the religious stance, because his epistemology is strongly voluntarist in the sense that he believes that the canons of rationality and the evidence available at any point in time do not determine what our beliefs should be.[14] On this view, going beyond the evidence to belief in a deity is perfectly rational. Yet consider the historical links between empiricism and secularism.[15] Note also the similar antipathy to the supernatural in the materialist tradition as point out at the end 3 above. Most significant is the case of Hume for he is both paradigmatic of empiricism and secularism and atheism. Compte and others readily come to mind. Indeed, surely the centrality of the disdain for explanations within the empirical stance is amenable to the secularist's insistence that once objectifying inquiry has done its work further calls for explanation are inappropriate. The world of the Humean empiricist, with its brute regularities and concatenation of unconnected events—'just one damn thing and then another'—is surely so thoroughly disenchanted as to appeal to some secularists.

The scientistic stance outlined in Sect. 4 incorporates elements of both empiricism and materialism. It retains some features of empiricism, namely the disdain for demands for explanation, and their satisfaction by posit, and the hostility to non-naturalistic metaphysics. These are just what make empiricism amenable to the secularist who regards the religious picture of reality as empirically ungrounded metaphysics posited only to explain the existence of the world, the meaning of human life and the persistent mythologies of certain cultures. From materialism, scientism takes the idea that we should have metaphysical picture of the world to discipline scientific methodology, and science and education policy, and it should be the one that incorporates and is most well-supported by the scientific image. van Fraassen says that: "The problem for materialists will then be to identify the true materialist stance and for the empiricist to identify the true empiricist stance" (2002, p. 61.) According to the above, the true empiricist and materialist stances are compatible and their synthesis is a scientistic and secular worldview.

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[14] This is made most explicit in his 1989, 2000 and 2002. Elsewhere (2007) I argue that van Fraassen's epistemology is too weak to be acceptable.

[15] Rowbottom (2005, p. 209), also associates empiricism with antipathy to the supernatural.

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